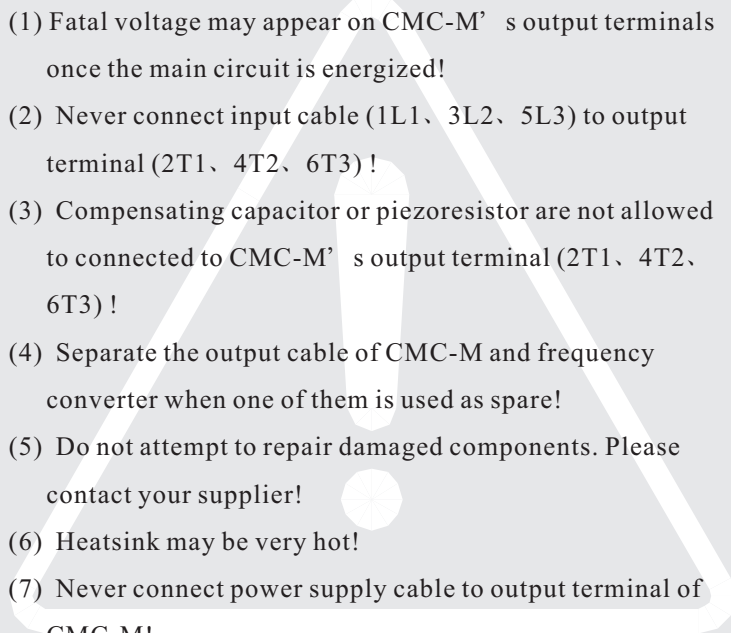# Safety Precautions

(1) Fatal voltage may appear on CMC-M's output terminals once the main circuit is energized!

(2) Never connect input cable (1L1、3L2、5L3) to output terminal (2T1、4T2、6T3)！

(3) Compensating capacitor or piezoresistor are not allowed to connected to CMC-M's output terminal (2T1、4T2、6T3)！

(4) Separate the output cable of CMC-M and frequency converter when one of them is used as spare!

(5) Do not attempt to repair damaged components. Please contact your supplier!

(6) Heatsink may be very hot!

(7) Never connect power supply cable to output terminal of CMC-M!

(8) Fatal voltage presences on output side both when CMC-M is starting and stopping!

Table of contents

Foreword

Foreword

Thanks for choosing CMC-M for your application. For proper operation and good performance of the starter & security of operators please read this instruction manual carefully before operation. Contact us or our local distributor if you have any problem that is not mentioned in this manual during the operation of CMC-M. We will by all means to solve your problem.

Chapter1 Description and Features of CMC-MSoft Starter

1.1 Description

CMC-M Motor soft starter is a new kind of motor starting and protecting device which is integrated with electronic power technology, microprocessor and automatic control. This starter provides smooth, step-less soft start and stop control that protect the machine from mechanical or electric impact caused by conventional starting modes such as direct starting, Y-delta starting and selfcouping starting, start current as well as requirement for power distribution are reduced considerably therefore the expense is reduced.

1.2 Features

! **Multiple start mode**

Current limit start, voltage ramp start, voltage ramp start with current limit, and programmable kick-torque and current limit are available for each mode. CMC-M is prepared to match the aggressive application, start your motor in the best way.

! **Improved reliability**

Greater system operation accuracy and high process speed due

to the digitalization of the signal in the control circuit by which avoids the adjustment in the analogous circuit.

! Interference resistances

Isolated external controllings and classed jam resistance assured the device is applicable for operating in aggressive industrial environment.

! Simplized operation

With the help of multi-purpose control system the starter can adapt to different applications through direct user interface by selecting different preset options and make a quick set up.

! Compact Size

The unique compact designed CMC-M reduces cost for customers due to the convenience to retrofit inside the existing motor cabinets.

! Frequency self-adopting to electrical supply

CMC-M provides frequency (50/60Hz) self-adopting function which is a convenience for customer.

! Analogue output

CMC-M provides an output current signal of 4-20mA for customer.

! Advanced protection

Multi-protections as over current, input/output phase missing, thyristor short circuit, overheat protections keep the motor and

Chapter2 Receiving Inspection

Every CMC-M has been tested for all functions and operation before delivery. Please inspect it as following steps when you receive your control. Please contact the supplier for any problem or damage.

1、Check the nameplate of the CMC-M is certain that the product you received correspond to your order.

(1)Nameplate description of CMC starter

CMC Series Motor Soft Starter	
Product model: CMC-	Motor power: KW
Power supply: 380VAC	Category: AC-53b
National standard: GB14048. 6-2008	
XI'AN SPREAD ELECTRIC CO., LTD.	
TEL.:+86-29-85692700/85692711	

(2) Model description of CMC starter

CMC─□□□/□

      └─ Line voltage: e.g. 3 represent 380V

    └─ Power of applicable motor

  └─ Product code
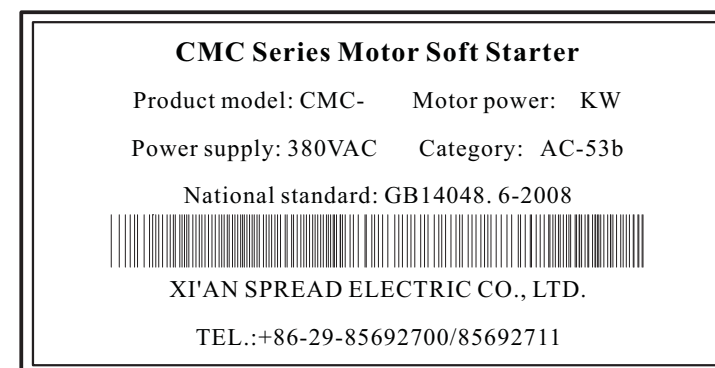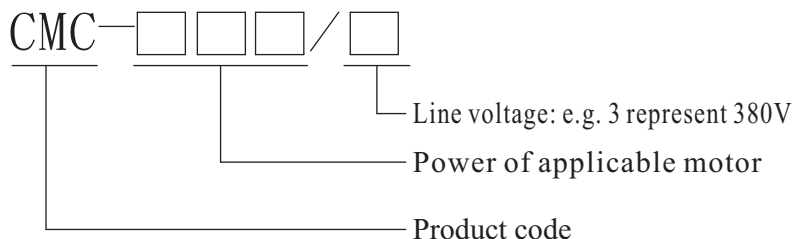
(3)Serial description of CMC starter

NO : XXXXXXXXXXXXXXXXXXCMC─XX□□□

       └─ L: Digital type

        M: Intelligent Digital type

      SX:Intelligent Chinese characters display type

     M2: Private for Machine

2、Inspect for shipping damage as housing depression or distortion, loose part inside the machine or loose wiring.

3、Verify each starter is packed with Quality Certificate, Warranty Certificate, Packing List and Instruction Manual。

4、Warranty for our product is according to the Warranty Certificate. Please fill the Warranty Certificate and send it back to xichi. Spread Electric Co., Ltd. or the supplier after you accepted the machine.

Chapter3 Operation Condition and Installation

3.1 Operation Condition

Control supply	AC110V--220V+15%，50/60Hz
Power supply	AC380V、660V、1140V±30%
Rate current	15~1000 Amps, 22 ratings totally
Adoptable motor	Standard three phase AC squirrel cage motors
Ramp mode	Current limit start, voltage ramp start, voltage ramp start with current limit
Stop made	Current limiting, voltage ramp, voltage ramp with current limit
Logic input	Impedance：1.8K，control voltage：+15V
Maximum starts per hour	May start frequently or infrequently, we recommend less than 10 starts per hour
Protections	Phase failure, over current, short circuit, SCR protection, over heat, etc.
IP grade	IP00、IP20
Cooling method	Natural cooling or forced air cooling
Install mode	Wall suspending type
Physical location	Derate Amp rating when Altitude is above 2000 meters Ambient temperature is：−25℃ ~ +45℃ Humidity is less than 95%（20℃±5℃） No flammable, explosive, corrosive gases, conductive dusts, installed indoor and ventilated well Vibration is less than 0.5G

3.2　Direction

It should be installed vertically for effective cooling and ventilation when soft starter is in operation.

3.3　Dimension

For convenience of maintenance, there must be enough clearance (see Appendix 3) between the wall and starter and also for sufficient air flow. Please log on our website www.xichi.cn to download the size of relevant air blowers if it is needed.

3.4 Electrical installation

Input power cables are connected to the top of the device and output cables are connected to the bottom. The cable should be big enough concerning the current will go through. Please see Appendix 1 for selection of relevant parts.

Chapter 4 Electrical Connection

4.1 Basic schematic diagram

Terminal 1L1, 3L2 and 5L3 of soft starter are connected to three-phase power supply and 2T1, 4T2 and 6T3 are connected to motor. Customer may select phase sequence check by set the relevant parameter. The in-built signal relay K2 can be used to control the contactor when bypass contactor is applied.
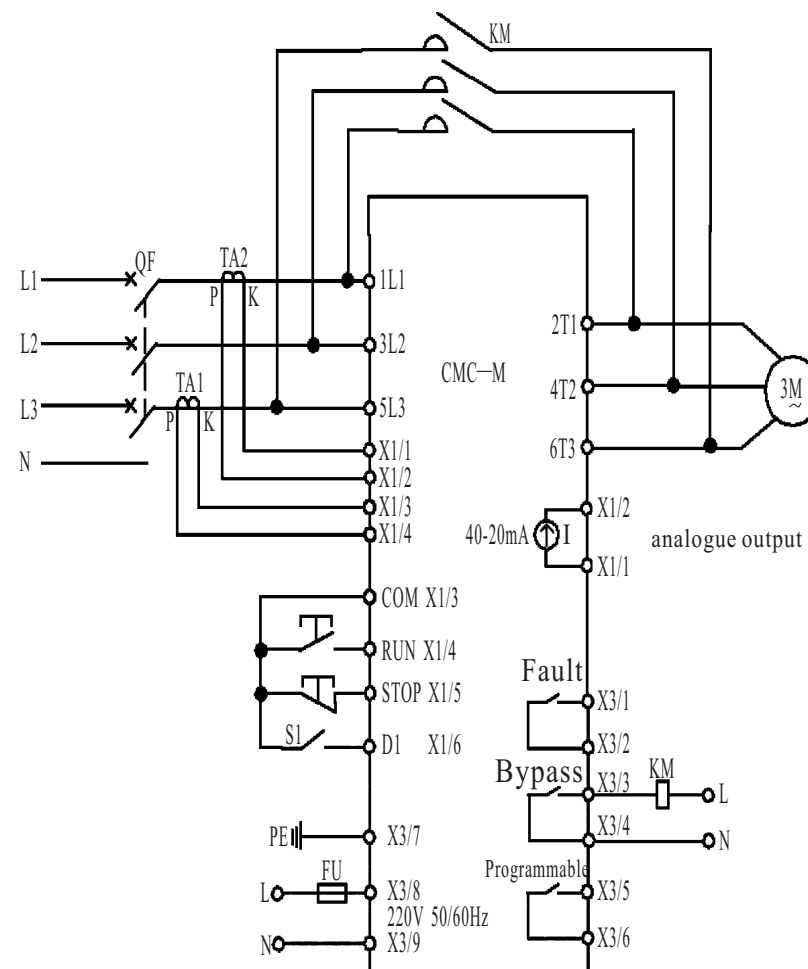
4.2 Diagrammatic picture

L1 L2 L3

QF
circuit breaker

KM
bypass contactor

CMC-M
soft starter

Motor
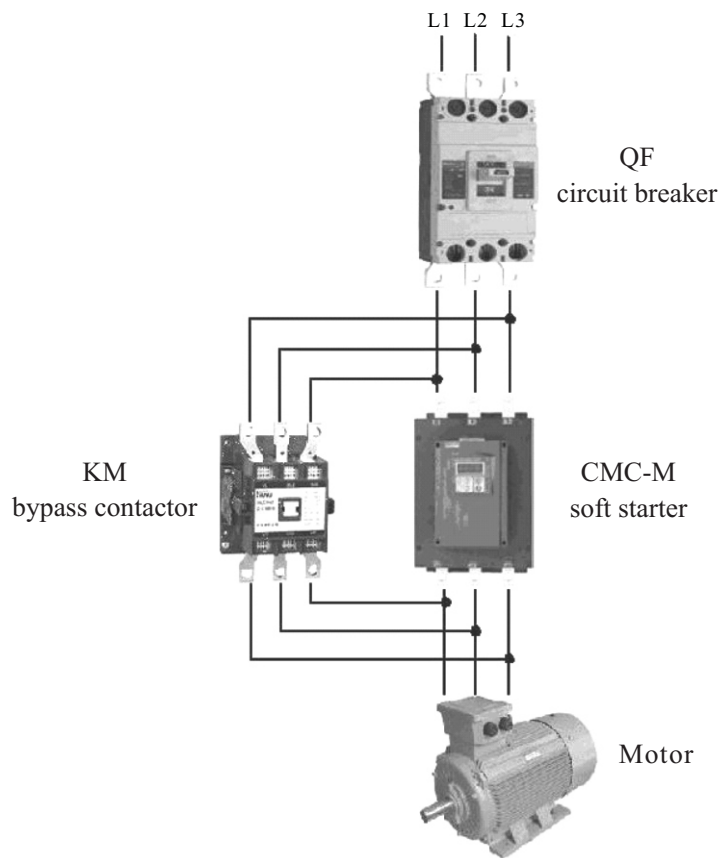
4.3 Diagram for typical application
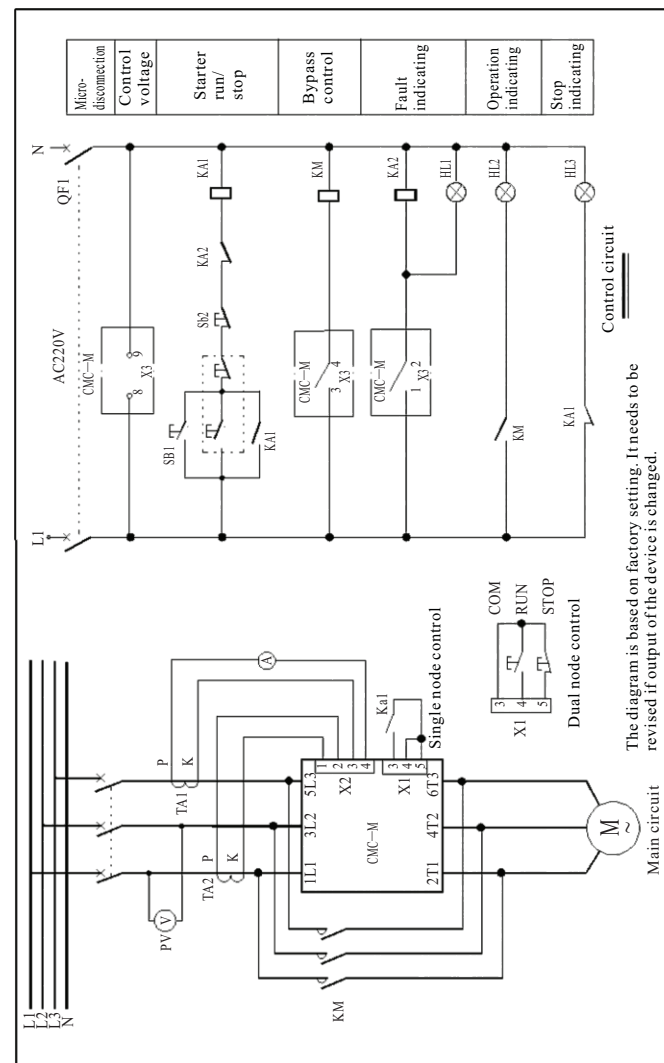
Note:

1. The above diagram is for single node control mode. Soft starter runs when connection point contacted; soft starter stops when connection point break contacted. Run command by LED panel is disabled when starter is connected according to this diagram. Terminal 3, 4 and 5 for run/stop signal is a passive node.

2. PE wire for the starter should be as short as possible and connected to the nearest ground point. The appropriate ground point should be on the mounting plate next to soft starter. The mounting plate should be grounded as well which is not protective grounding but functional grounding.

3. Secondary wire diameter of current transformer should be not less than 2m m2. Please differ input wire P from output wire K when current transformer is connected to the system. Please connect the current transformer according to Diagram for typical

4.4 Terminal description

There are 19 external control terminals on CMC-M starter which is convenience for users to control the device by external signal, remotely and systematically.

Terminal No.		Name of terminal	Description
Main loop	1L1、3L2、5L3	Terminal for power supply	Connected tothree-phase AC power pack
	2T1、4T2、6T3	Output terminal of CMC-M	Connected to three-phase asynchronous motor

Control circuit	X1/1	Analogue output 1	4~20mA(0~2Ie) (150--500Ù) Impedance of output signal
	X1/2	Analogue output 2	
	X1/3	COM	Common for logic controlling
	X1/4	input terminal for remote run (RUN)	Jump X1/3与X1/4 to run
	X1/5	input terminal for remote stop (STOP)	Disconnect X1/3与 X1/5 to stop
	X1/6	Input terminal for programmable digital controlling D1	Selected by parameter C202
	X2/1	Input terminal for L1 phase current sampling	L1 phase current sampling
	X2/2		
	X2/3	Input terminal for L3 phase current sampling	L3 phase current sampling
	X2/4		
	X3/1	Relay contact K1 for fault output	When the relay is powered, K11 and K12 are closed. Contact capacity: AC250V/5A，DC30V/5A
	X3/2		
	X3/3	Relay contact K2 for bypass output	When the relay is powered, K21 and K22 are closed. Contact capacity: AC250V/5A，DC30V/5A
	X3/4		
	X3/5	Relay contact K3 for programmable output	When the relay is powered, K31 and K32 are closed. Contact capacity: AC250V/5A，DC30V/5A
	X3/6		

X3/7	PE	Functional grounding
X3/8	Terminal for Control voltage	AC110V---AC220V+ 15% 50/60Hz
X3/9		

Chapter5 Display and Operation

5.1 View of panel
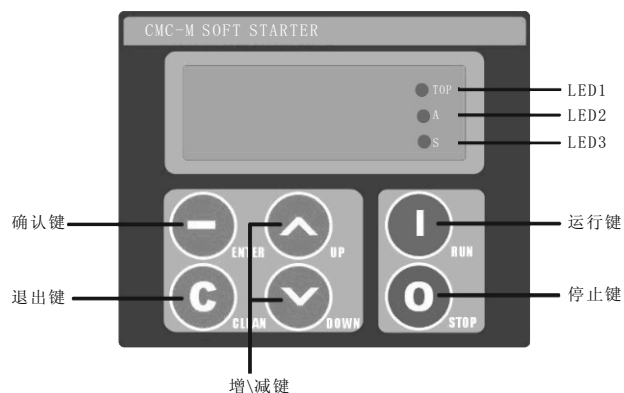
⚠ Average current is displaying during operation (motor starting, stopping and running). There are 3 LEDs on upside of the panel right hand. LED1 is marked TOP. It flashes during motor starting or stopping and is luminant when the motor starts up. LED2 is marked A and is luminant when current is displayed. LED3 is marked S and is luminant when time is displayed.

5.2 Function description of keys

Symbol	Name	Function description
⊖	Enter button	Enter the parameter menu, and select the parameter item to modify
⌃	Up button	Scrolls through parameters up wise and increases a parameter setting
⌄	Down button	Scrolls through parameters down wise and decreases a parameter setting
C	Exit button	Confirm the modified parameter and exit the parameter item and parameter menu
RUN	Button	To run the starter when button control is enabled. Jump terminals X1-3 and X1-5.
STOP	Stop button	To stop the starter when button control is enabled. Keep pressing the button for four seconds to reset present fault trip.

5.3 Description of displaying

No.	Displaying	Status description	Note
1	5ГOP	Stop	CMC-M is ready for operation

2	⌈⌀⌀⌀⌀	Programming	Can read or set parameters
3	⌐--⌐	Leakage detect	CMC-M is detecting if there is an electrical leakage.
4	⌐⌀⌀1	Countdown for running	CMC-M is counting down to run the motor.
5	L2⌀⌀	Countdown for braking	CMC-M is counting down to brake.
6	Err1	CMC-M tripped	CMC-M tripped for some reason.

5.4 Procedure to Modify Parameter
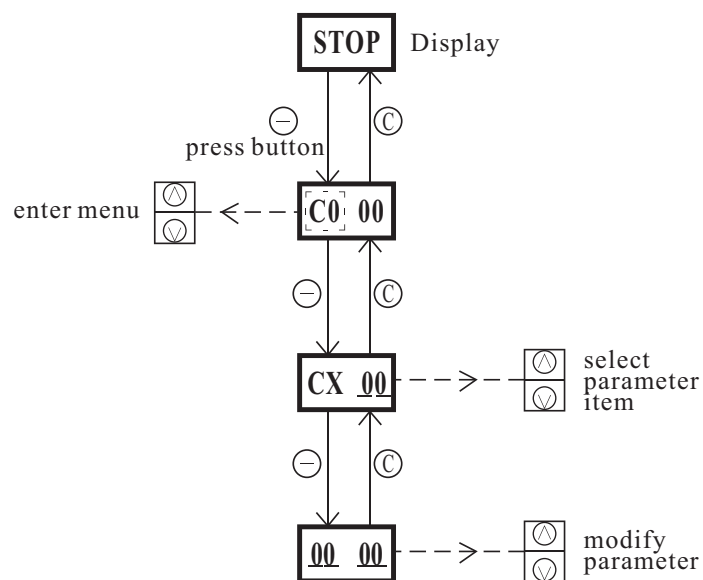
Chapter6 Control pattern of soft starter
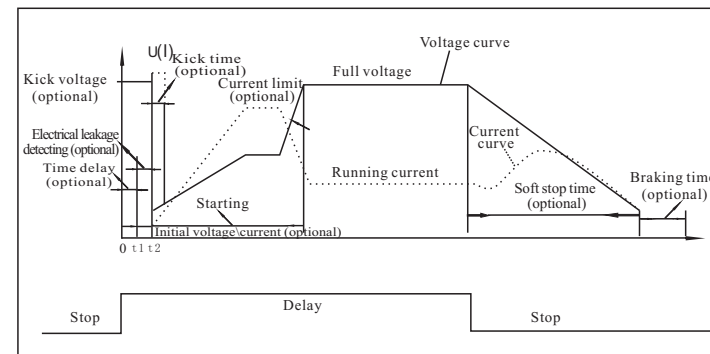
Characteristic Curve of Soft Start/Stop Voltage (current)

Start and Stop Features

CMC-M provides multiple modes to start a motor including Voltage Ramp Start, Current-limiting Start, and Voltage Ramp Start with Current Limit. It also provides multiple modes to stop a motor including free stop, soft Stop and Brake, soft stop plus brake. Customers may choose different mode according to motor load and specific applications.

6.1 Current-limiting start

Starting time is set zero when current-limiting start is applied. CMC-M 's output voltage will ramp up rapidly till the output current reaches the preset current limit I_m when CMC-M get a start command. The I_m is
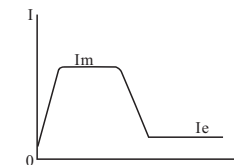
kept for a period and motor accelerates continually while output voltage ramp up rapidly to full value thus the motor starts up.

Parameter	Description	Range	Set value	Factory set
C004	Starting time	0~60S	0	10
C005	Current limit	100~500%Ie	---	300

Note: "---" means that user can set according to specific application.

6.2 Voltage ramp start

This starting mode is applicable to large inertia load. It can reduce starting impact and mechanical stress considerablely for situations that smooth start are required.

Parameter	Description	Range	Set value	Factory set
C000	Ramp mode for start	0---1	0	0
C003	Initial voltage\current	(20~100%)Ue\(20~100%)Ie	---	30%
C004	Starting time	0~60S	---	10
C005	Current limit	100～500%Ie	---	300%

6.3 Current ramp start

When soft starter get the start command its output current ramp up to Im within preset time while the voltage increases at a certain

rate and the current is kept under Im till motor starts up. This start mode provides a stable current and avoids motor vibration in case a fractional load.

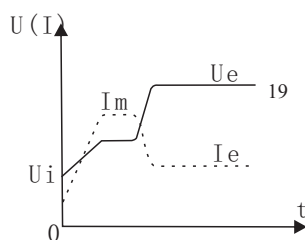| Parameter	Description	Range	Set value	Factory set
C000	Ramp mode for start	0---1	1	0
C003	Initial voltage\current	(20~100%)Ue\(20~100%)Ie	---	30%
C004	Starting time	0~60S	---	10
C005	Current limit	100～500%Ie	---	300%

6.4 Kick torque start

Kick torque start is mainly used on high stiction loads by which friction is brokenout a sudden torque applied to the load. The output voltage reaches preset kick voltage rapidly and keeps at it before the kick start time runs up. Then the CMC-M starts the motor according to preset initial voltage\ initial current and starting time till it starts up.

Kick torque start is always selected together with other start modes and kick voltage and kick time should be set.

Parameter	Description	Range	Set value	Factory set
C000	Ramp mode for start	0---1	---	0
C001	Kick voltage	20~100%Ue	---	0
C002	Duration of kick start	0～200×10mS	---	0
C003	Initial voltage\current	(20~100%)Ue\(20~100%)Ie	---	30%

6.5 Free stop

When both ramp down time (C007) and braking time (C009) are set zero motor will stop freely. After soft starter receives stopping command, it firstly disconnects the control relay of bypass contactor and consequently lockout the output of thyristor on main circuit. Motor stops freely according to inertia load

Parameter	Description	Range	Set value	Factory set
C007	Ramp down time	0~60S	0	0
C009	Braking time	0~250S	0	0

6.6 Soft stop

When soft stopping is selected CMC-M dis-contacts bypass contactor and ramp down voltage to the set point within stopping time. Process of Soft stopping process ends and CMC-M puts out a brake signal (braking time is not set zero) or the motor stop freely.

Parameter	Description	Range	Set value	Factory set
C007	Ramp down time	0~60S	---	0
C008	Ramp down voltage	20~60%Ue	---	20
C009	Braking time	0~250S	0	0

6.7 braking

When parameter of braking time is set and a time relay is selected CMC-M will brake stop motor directly in case soft stop function is not selected and it will carry out a soft stop process before brake in case the soft stop function is elected. The output

signal from time relay is valid within braking time and may control the external brake unit or the control unit of mechanical brake.

Parameter	Description	Range	Set value	Factory set
C007	Ramp down time	0~60S	0	0
C009	Braking time	0~250S	---	0
C204	Output signal of relay K3	0. Full voltage 1. Ramping up 2. Ramping down 3. Fault 4. Braking 5. Running at full voltage 6. Programmable time delay 7. Electrical leakage detecting	4	6

6.8 Soft stop plus braking

CMC-M disconnects bypass contactor and ramp down voltage to the set point within stopping time when soft stopping time and braking time are set. CMC-M brakes to stop after soft stopping process completes within braking time.

Parameter	Description	Range	Set value	Factory set
C007	Ramp down time	0~60S	---	0
C008	Ramp down voltage	20~60%Ue	---	20
C009	Braking time	0~250S	---	0
C204	Output signal of relay K3	0. Full voltage 1. Ramping up 2. Ramping down 3. Fault 4. Braking 5. Running at full voltage 6. Programmable time delay 7. Electrical leakage detecting	4	6

Chapter7   Parameter and Description

Parameters of CMC-M soft starter are divided into groups: parameters start with C0 which are for motor starting or stopping, the ones start with C1 which are for protections, the ones start with C2 which are for port setup and the rest are start with C3 which are for data recording.

7.1 Parameters for motor starting or stopping, C000-C009 10 parameters totally

Parameter	Description	Range	Factory set
C000	Ramp mode for start	0. voltage ramp 1. current ramp	0
C001	Kick voltage	20~100%Ue	20%
C002	Duration of kick start	0 ~ 200 × 10mS	0
C003	Initial voltage\current	(20~100%)Ue\ (20~100%)Ie	30%
C004	Starting time	0~60S	10
C005	Current limit	100～500%Ie	300%
C006	Second starting permit	0~60S	0
C007	Ramp down time	0~60S	0
C008	Ramp down voltage	20~60%Ue	20%
C009	Braking time	0~250S	0

7.2 Parameters for motor protection, C100-C105 6 parameters totally

Parameter	Description	Range	Factory set
C100	Motor rate current	15.0~9999A	---
C101	Over current	(100~500)%Ie	150%
C102	Electrical thermal overload	10A、10、15、20、25、30	20
C103	Phase sequence check	0、to check 1、not to check	1
C104	SCR protection	0-SCR protection enabled 1- SCR protection disabled	0
C105	Time limit for starting	0---120S	80
C106-C109	Not identified	---------	---

7.3 parameters for port setup, C200-C205 6 parameters totally

Parameter	Description	Range	Factory set
C200	Control mode selecting	0、Control through terminals 1、Control through keyboard 2、Both panel control and terminal control are enabled	2
C201	Start delay	0~250S	0
C202	Input signal for terminal D1	0、Fault reset 1、Signal form time delay relay K3 2、Emergency stop 3、Electrical leakage locked detection	0

C203	Time delay for relay K2	0~250S	0
C204	Output signal of relay K3	0. Full voltage 1. Ramping up 2. Ramping down 3. Fault 4. Braking 5. Running at full voltage 6. Programmable time delay 7. Electrical leakage detecting	6
C205	Time delay of relay K3	0~250S	0
C206-C207	Parameter of Manufacturer	Not allowed to modify	---
C208-C209	Not identified	---	---

7.4 Parameters for data recording, C300-C309 parameters totally

Parameter	Description	Range	Factory set
C300	Rate current of CMC-M	15.0~9999A	----
C301	Not identified	----	----
C302	Precision of displayed current	Not allowed to modify	---
C303	Current rectification	Not allowed to modify	---
C304-C306	Parameter of Manufacturer	Not allowed to modify	---
C307-C309	Not identified	-------	---

7.5 Function description

◆ **Parameters for motor starting or stopping C0 (refer to chapter 6 for starting modes description)**

Customer may get the best start curve by selecting different start modes through parameter group C000, to meet load requirement of specific application. A start torque will be applied to motor at the beginning of motor starting and then CMC-M starts the motor according to preset initial voltage\ initial current and starting time till it starts up. If parameter item C006 is not set zero CMC-M will start the motor according to the preset initial voltage\ initial current and starting time the second time in case the motor does not start up when starting time is up until the motor starts up. Starting current limit will be restricted under the value what parameter item C005 set.

Note: The corresponding parameter item C003 represents initial voltage when start mode is set voltage ramp and it represents initial current when start mode is set current ramp.

Setting of parameter item C004 namely starting time will decide when to increase initial torque to full torque. The motor will generate a lower accelerating torque if the starting time is long enough. The motor has time to accelerate to nominal speed only if an appropriate starting time is set. CMC-M will limit the torque within torque limit when accelerating time is up before motor starts up. Starting time means rate of rotation change but not equal to time the

motor takes to start up.

◆ **Parameters for protection C1**

Customer may set parameter item C100 namely motor rate current so that CMC-M fits motor nicely and protects motor comprehensively. CMC-M will trip the motor if its running current exceed the value that parameter item C101 set. CMC-M will trip the motor for over current if its running current exceed the value that parameter item C101 set. CMC-M will trip the motor for electrical thermal overload if it surpasses the thermal overload grade and trip time that parameter item C102 set. The fault information will be displayed on panel for customer's trouble shooting. (Rate current of motor should not less than 50% of CMC-M's rate current.)

Please set parameter item C103 not to check phase sequence if it is not required, vise versa. Please set parameter item C104 "1" if SCR protection is not required, other wise set it "0".
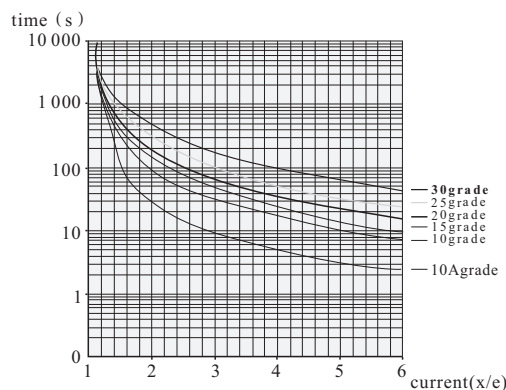
Trip curve for electrical overload

◆ **Parameters for port set, C2**

Customer may start or stop CMC-M by parameter item C201. Parameter item C201 works together with other parameters to starts motor. Soft starter begins to start motor only when time delay which is set in parameter item C201 is up after CMC-M gets a valid start command.

Parameter item C202 is to set input signal mode of programmable terminal D1.

Fault reset: CMC-M will start motor again if a start command present when the fault is reset.

Time delay relay K3: output signal of time delay relay K3 is set a programmable time delay signal automatically.

Electrical leakage locked detecting: output signal of time delay relay K3 is set electrical leakage locked detecting automatically.

Ø**Bypass relay K2:** relay K2 contacts when time delay is up in case a time delay is set in parameter item C203.

Ø**Relay K3:** parameter item C204 and C205 are to control the output of relay K3.

Full voltage: contacts when output voltage reaches rate voltage (parameter item C205)

Starting: soft starter is starting the motor (time delay set by parameter item C205 is up). The signal will not put out if voltage increases to full before the time delay is up.

Soft stopping: the signal put out when soft starter is ramping down (time delay set by parameter item C205 is up and it is less than the soft stopping time set by parameter item C007)

Fault: put out the signal when a fault is detected by soft starter (time delay set by parameter item C205 is up)

Braking: put out the signal when soft starter is braking (time delay set by parameter item C205 is up and it is less than the braking time set by parameter item C009)

Running: put out the signal during motor running (time delay set by parameter item C205 is up)

Programmable time delay relay: parameter C202 must set time delay relay input which is take as a time delay relay.

Electrical leakage locked detecting: parameter item C202 must set electrical leakage locked detecting input and parameter item C205 must set "0"

Voltage	Insulation resistance to earth for single phase
AC380V/660V	Electrical leakage detecting act when It's ≤ 20kΩ+20%
AC1140V	Electrical leakage detecting act when it's ≤ 40kΩ+20%
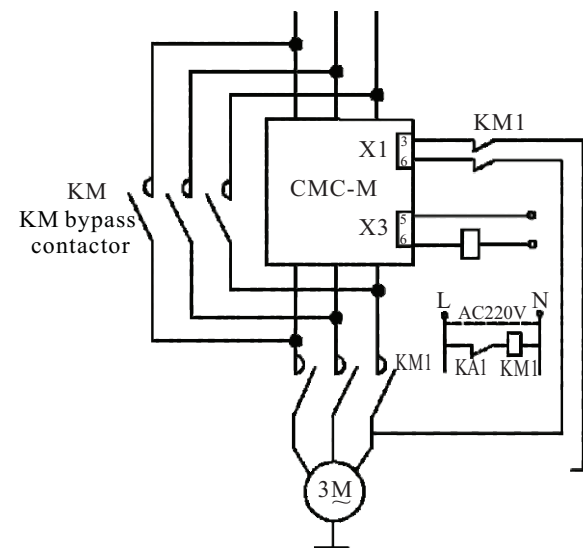
Schematic picture for electrical leakage detecting

◆ **Parameters for recording, C3**

This parameter group is to recording CMC-M 's operation information and state information which can not be modified by customer.

Chapter8   Trouble shooting

8.1 Diagnostic table

CMC-M will trip to stop when protection acts and a fault code will be displayed on panel by which customer may shoot the trouble.

Display	State description & causes	Corrective action
5ΓOP	Motor does not react when start command is applied	1、 Check if terminals 3, 4, 5 are connected. 2、 Check control circuit if it is connected properly and if control switch works properly. 3、 Check if control voltage is too low. 4、 Parameter C200 is not properly set.
No display		1、 Check if terminal 8 & 9 of X3 are jumped. 2、 Check if control voltage is of ?
Err1	Phase missing during motor starting	1、 Check phase voltage of power pack and correct it if a phase is missing.
Err2	SCR overheat	1、 Check if CMM-M is ventilated well and installed vertically. 2、 Check if heatsink of Comic-M is overheating or switch for heatsink is Disconnected. Start of CMC-M is too much, reduce its start frequency. 3、 Control voltage is too low. Voltage loss during starting is too much.
Err3	Motor start failure	1、 Check if each parameter setting matches motor parameter. 2、 Check if current limit is too low or transformation ratio of current transformer is not correct.
	Input side and output side of CMC-M are short circuit Input side and output side form a	1、 Check if bypass contactor is contacted. 2、 Check if SCR is brokendown or damaged.
Err4	Motor circuit is a Open circuit (parameter C104 is set "0")	1、 Check if CMC-M is connected to motor properly and reliably. 2、 check if there is a open circuit inside motor Check if motor is 3、 Check if SCR is brokendown or damaged. 4、 Check if one phase is missing on input cable.

Err5	current limiting failed	1、 Check if current transformer is connected to 1,2,3,4 of terminal X2 and make sure it is not reversed. 2、 Check if the device for current limiting works. 3、 Check if ratio of current transformer is Correct.
	Over current during running	1、 Check if there is a short circuit on output side of CMC-M. 2、 Sudden load weighting? 3、 Fluctuating load? 4、 Check if current transformer matches
Err6	Electrical leakage on motor	1、 Insulation resistance between motor and earth is not high enough.
Err7	Electrical thermal overload	1、 Excessive load?
Err8	Phase reverse	1、 Reverse input lines or set not to check phase sequence
Err9	Data loss	1、 Put the starter out of service and contact supplier if you this fault is encountered.

8.2 Fault reset

CMC-M memories fault information. Therefore customer need to reset the fault record through STOP button (keep pressing over four seconds) or put in a reset signal to terminal D1 after a fault is cleared so that the starter is recovered to stand by for operation.

Chapter9   Maintenance

1、 Dust: too much dust will lower insulation grade of starter and may lead to poor performance.

(1) Dedust gently by dry clean brush.

(2) Dedust by compressed air.

2、 Moisture condensation: moisture condensation may lower insulation grade of soft starter and may lead to poor performance.

　(1) Dry condensation with an electrical blower or an electrical heater.

　(2) Dehumidify power distribution room.

3、Inspect intactness of components in starter periodically to ensure there are in good condition.

4、Check the cooling channel of soft starter and make sure it's not blocked by sundries and dust.

⚠ **Maintenance & inspection must be proceed after all input power supplies of soft starter are disconnected!**

Chapter10　Description of Appendix

Appendix 1　Catalogue No. and Accessories (380V)

Motor (KW)	Model of soft starter	Rated current(A)	Model of bypass contactor	Current transformer	Diameter. of Primary circuit (copper)
7.5	CMC-008-3	18	CJX4-25	50\5	6 mm2
11	CMC-011-3	24	CJX4-32	50\5	10 mm2
15	CMC-015-3	30	CJX4-32	100\5	16 mm2
18.5	CMC-018-3	39	CJX4-40	100\5	16 mm2
22	CMC-022-3	45	CJX4-50	100\5	16 mm2
30	CMC-030-3	60	CJX4-63	100\5	25 mm2
37	CMC-037-3	76	CJX4-80	200\5	25 mm2

45	CMC-045-3	90	CJX4-95	200\5	35 mm2
55	CMC-055-3	110	CJX4-115F	300\5	50 mm2
75	CMC-075-3	150	CJX4-150F	300\5	70 mm2
90	CMC-090-3	180	CJX4-185F	400\5	20×3 Copper row
110	CMC-110-3	218	CJX4-225F	500\5	20×3 bar copper
132	CMC-132-3	260	CJX4-265F	500\5	25×3 bar copper
160	CMC-160-3	320	CJX4-330F	600\5	30×3 bar copper
185	CMC-185-3	370	CJX4-400F	600\5	30×4 bar copper
220	CMC-220-3	440	CJX4-500F	800\5	30×4 bar copper
250	CMC-250-3	500	CJX4-500F	1000\5	40×4 bar copper
280	CMC-280-3	560	CJX4-630F	1000\5	40×4 bar copper
315	CMC-315-3	630	CJX4-630F	1500\5	40×5 bar copper
400	CMC-400-3	780	JWCJ20-800	1500\5	50×5 bar copper
470	CMC-470-3	920	JWCJ20-1000	1500\5	50×5 bar copper
530	CMC-530-3	1000	JWCJ20-1000	1500\5	50×6 bar copper

Notice for ordering

Inform the supplier of the model No., power, application and the operating condition so as to select the product properly when ordering.

ØStandard CMC starter does not integrate bypass contactor and current transformer, please choose the bypass contactor and the current transformer (two for each) according to model and specification listed in above table while purchasing. Current transformer must be connecting to the position the basic schematic diagram.

Ø Selection of accessories is according to current of controller when line voltage is AC660V, AC1140V. Selection of corresponding current transformer and contactor is according to current of controller.

Ø Accessories specification in above table is only for reference

Appendix 2 Basic setting for different application (only for reference)

Load type	Initial voltage (%)	Ramp time of starting (sec.)	Ramp time stopping (sec.)	Current limit ILIM
Propeller	20	10	0	2.5
Centrifugal fan	15	20	0	3.5
Centrifugal pump	20	6	6	3
Piston compressor	20	15	0	3
Lifting device	30	15	6	3.5
Mixer	40	15	0	3.5
Crusher	30	15	6	3.5
Screw compressor	20	15	0	3.5
Spiral conveyor	15	10	6	3.5
Idling motor	20	10	0	2.5
Belt conveyor	20	15	10	3.5
Heat pump	20	15	6	3
Elevator	20	10	0	3
Gas pump	20	10	0	2.5

Appendix 3 Frame size of CMC-M and Perforate dimension (unit mm, take 380V as example)

Model	G	H	I	K	L	M	A	B	C
CMC-008~075	173	286	203	133	250	7	20	10	100
CMC-090~185	286	440	220	240	357	9	20	10	100
CMC-220~315	325	480	220	279	386	9	20	10	100
CMC-400~530	407	620	220	350	481	9	20	10	100
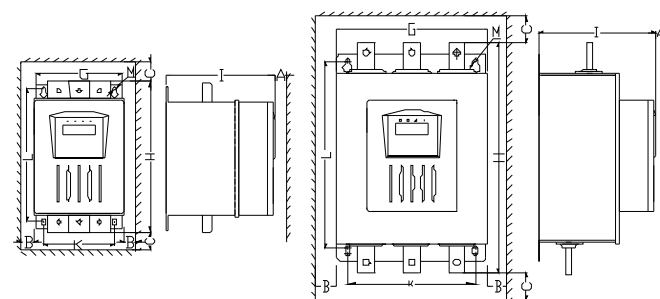
Products of 75KW and below   Products of 90KW and above

Appendix 4 Model Selecting to Soft Starter

Note: size of F001:173×286×203、F002:286×440×220、F003:325×480×220、

Number	Rate current (A)	380V		660V		1140V	
		Power (KW)	Size (mm)	Power (KW)			Power (KW)
1	18	7.5		15			
2	24	11		22			
3	30	15	F001	30	F001		
4	39	18.5		37			
5	45	22		45			

6	60	30	F001	55	F001		
7	76	37	F001	75	F001		
8	90	45	F001	90	F001		
9	110	55	F001	110			
10	150	75	F001	132			
11	180	90	F002	160	F002	280	F002
12	218	110	F002	200	F002	344	F002
13	260	132	F002	250	F002	400	F002
14	320	160	F002	300	F002	505	F003
15	370	185	F002	350	F002	584	F003
16	440	220	F003	400	F003	695	F003
17	500	250	F003	456	F003	789	F003
18	560	280	F003	500	F003	884	F004
19	630	315	F003	560	F004	995	F004
20	780	400	F004	700	F004		
21	920	470	F004				
22	1000	530	F004				

F004:407 × 620 × 220(width × length × thickness)